systematic zoology, are now those which excite the liveliest interest. *Lophogaster typicus*, a Crustacean discovered by M. Sars on various parts of the Norwegian coast, is one of these forms.

Milne-Edwards combined the *Euphausidæ* and *Mysidæ* with the *Squillidæ* and *Amphionidæ* to form an order distinct from the Decapoda, and for which he retains Latreille's name of Stomapoda. This order is characterized by the absence of thoracic branchiæ lodged in an internal cavity. Dana has followed the same course, his orders Eubranchia and Anomobranchia being synonymous with Decapoda and Stomapoda.

These orders are not, however, so distinct as they seem at first sight. The branchiæ of certain Macrourous Decapods (*Alpheus, Hippolytes, Stenopus*) are only partially covered by the carapace; and Kröyer has shown that in the genus *Sergestes* the sides of the carapace are not sufficiently prolonged to cover the branchiæ. These exceptions sufficed to show that these two orders of Crustacea form a continuous series; but, by his description of *Lophogaster*, M. Sars has made us acquainted with a link which unites them still more intimately.

In this Crustacean the thoracic branchiæ are ramified like the posterior branchiæ of the *Euphausidæ*. The upper part of the ramification is covered by the carapace in the manner of the branchiæ of the Decapoda, whilst the median and lower branches hang down freely in the water, as in the *Euphausidæ*. Other characters, to which it is unnecessary to advert, render the relationship of *Lophogaster* to both groups still more evident; and thus it appears that the whole of the Podophthalmous Crustacea form a single natural order. The Stomapoda seem to be only degraded Macrourous Decapods—an opinion which is supported by Professor Dana. The development of *Lophogaster* is precisely similar to that of *Mysis*.—*Bibl. Univ.* Sept. 20, 1864, *Bull. Sci.* p. 87.

On a Peculiarity in the Venation of the Leaves of the Genus Fagus. By Professor A. DeCandolle.

In the ordinary condition the lateral veins of a leaf occupy the centre of the lobes, or answer to the extremities of the teeth, when the leaf has lobes or teeth. Of the rare exceptions to this rule M. De Candolle has already indicated three in a note to p. 558 of vol. ix. of his 'Prodromus,' namely, *Coldenia procumbens*, Linn., *Cratægus oxyacantha*, Linn., and the *Rhinanthi*, in all of which the secondary veins correspond with the sinuses, and not with the projections, of the margins of the leaves. In the present paper he describes the occurrence of the same structure in certain species of *Fagus*.

Of the Beeches of the southern hemisphere, two, namely *Fagus Gunnii*, Hooker, and *F. antarctica*, Forst., have the veins constantly and distinctly corresponding with a sinus; but in some cases the veins even of the same leaf, towards the extremity, run partly to the teeth and partly to the notches. This is the case in *Fagus alpina*, Pöpp. & Endl., and even in the common *F. sylvatica*; but

in the latter the teeth are so faintly marked that it is not always easy to recognize this peculiarity. When this double direction exists in a leaf, the extreme veins, which are the shortest, are straight, and clearly terminate in a tooth, just as the central vein terminates in the tooth of the extremity of the leaf. The other veins are curved near the tooth in such a manner that the nearer we approach the base of the leaf the more do the veins correspond (or appear to correspond) with the notches. The organogeny of the leaf would probably show that at first the veins of these species all answer to teeth, and that the growth of tissue alone has caused them to deviate, except at the extremity, where the leaf is less enlarged.

The direction of the veins furnishes, however, a good character for distinguishing the Japanese *Fagus Sieboldii* and the *F. ferruginea* (*F. sylvestris*, Mirb.) from the European *F. sylvatica*. Linnæus regarded the North American Beech as belonging to the European species, and in this he has been followed by some modern botanists. Mr. Bromfield, who has carefully observed the American species, admits the specific difference of the two Beeches (Hooker's Journal of Botany, 1849, p. 112); but he has not noticed the difference of the venation, which corroborates the other characters. In the North American Beech, as in the Japanese species, all the lateral veins evidently correspond in a straight line with the teeth, which are always distinct and well-marked. In the European Beech the teeth are less distinct, and often become mere undulations; and the veins are directed rather towards the notches, or at least become curved near the teeth, with the exception of those of the apex of the leaf.

The species which have all the lateral veins directed towards the teeth are, besides *F. Sieboldii* and *F. ferruginea* already mentioned, *F. obliqua*, Mirb., *F. Dombeyi*, Mirb., *F. fusca*, Hook., and *F. Cunninghamii*, Hook. Those in which all the lateral veins tend towards the sinuses are *F. antarctica*, Forst., and *F. Gunnii*, Hook. Those in which the majority of the veins are directed towards the sinuses are *F. sylvatica*, *F. alpina*, Pöpp. & Endl., and *F. procera*, Pöpp. & Endl. Lastly, in some species, which complete the genus, the teeth are wanting or very indistinct, or the veins are much attenuated, and sometimes the secondary ones become confounded with the tertiaries in a complicated network; in all these cases the direction cannot be readily ascertained. This applies especially to *F. Solandri*, Hook., and *F. cliffortioïdes*, Hook., from New Zealand, the leaves of which are entire.

The two species in which the veins most evidently alternate with the teeth (*F. antarctica* and *F. Gunnii*) belong to the section of the genus that includes those in which all the veins terminate in teeth, such as *F. Sieboldii* and *F. obliqua*, as well as our European Beech; these have the young leaf folded, in the bud, on each lateral vein. The direction of the veins is therefore a purely specific character; and this should warn palæontologists not to lay too much stress upon the details of venation as indicative of genera. Nevertheless the direction of the veins relatively to the teeth or sinuses deserves mention in the specific characters, especially of fossil species.

These diversities of venation would have appeared much more extraordinary a few years ago, before the modern observations upon the formation of the tissues of the leaf. It was then usual to speak of the veins as the *framework* of the leaves, which implied, more or less positively, the idea that they preceded the parenchyma, and that this was formed around them as about a solid point of support. We now know that every organ commences by being cellular and of slight consistence, and that the projecting parts precede the veins. Hence the woody tissues and the bones of organisms are only a consequence of the soft parts. It is, however, singular that in very nearly allied plants, and sometimes in two portions of the same leaf, the solid parts should sometimes occur in the middle of the lobes and sometimes outside of them; and it appears probable that at the actual moment of formation of the veins they would present a more constant position. Observations on the formation of leaves, and especially on the development of the veins, are not yet sufficiently numerous to lead to any conclusion upon this point. But probably it will be found that the exceptional veins, or those which run towards the lateral sinuses of the leaf, are veins which have deviated at a certain epoch, or veins which originally corresponded to a projection the termination of which has been arrested in its development, whilst the parts originally depressed have increased in size.—*Bibl. Univ., Archives des Sciences,* Oct. 1864, p. 164.

On the Development of the Flowers of the Compositæ.
By Professor Wolfgang.

The course of development, which may be observed particularly well in the common Sowthistle (*Sonchus arvensis*), is described by the author as follows:—"The flowers of the capitulum are developed after the leaves of the involucrum, in a direction from the periphery of the receptacle to its centre. The first traces of leaves appear in the form of oblique prominences, directly continuous with the epithelium of the receptacle. The future point of the flower by no means corresponds with the point of this prominence. Subsequently these commencements of flowers become perfectly hemispherical; the organic point of the bud remains behind in its growth, whilst around the apex there is formed a circular elevation, which in a short time forms a sort of crater. On the outside, a little above this annular rampart, there appear sometimes some cushion-like inflations, perhaps the commencement of the obliterated calyx. There is no trace of the pappus. Subsequently the five petals originate on the margins of the crater-wall; their increase takes place at the base, and they curve inwards successively in a geniculate form. The anthers follow these, alternating with them; they are developed on the inner slope of the crater. The petals become soldered together from the base up to the place where the lobes afterwards make their appearance. The pappus projects from the outer wall of the crater-margin, but not until the anthers have advanced considerably in their development: from its origin and its nature, it must be regarded as an accessory